

STUDIES IN AUSTRALIAN GRASSES: 5* NEW SPECIES OF AND NEW COMBINATIONS FOR QUEENSLAND PANICOID GRASSES

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Summary

New species, *Arthrargrostis clarksoniana*, *Cyrtococcum capitis-york*, *Panicum bombycinum*, *Panicum chillagoanum*, *Panicum robustum*, *Paspalum batianoffii*, *Paspalum multinodum* and *Yakirra websteri*, are described. New combinations made are *Brachiaria atrisola*, based on *Urochloa atrisola* and *Brachiaria holosericea* subsp. *velutina*, based on *Urochloa holosericea* subsp. *velutina*. An overview of the current situation regarding the taxonomy of *Brachiaria* and allied genera is given. The occurrence of *Brachiaria distachya* (L.) Stapf in Australia, New Caledonia and Fiji is established.

Introduction

There are a number of new Queensland grasses, first drawn attention to in 'A Key to Australian Grasses' (Simon 1990), that require formal description. Of these, the panicoid species are treated in this paper, with nine new species described and two new combinations made in the genus *Brachiaria* for taxa already described under *Urochloa* by Webster (1987). For each new species there is a Latin diagnosis, a full botanical description, a listing of specimens examined, a section on etymology, a section on conservation status, following the system used by Briggs and Leigh (1988), and some additional notes.

Arthrargrostis Lazarides

A panicoid grass with distinctive tubercle-based hairs on the upper glume and lower lemma was collected from York Downs, near Weipa on Cape York Peninsula, in 1981 by Anne Morton (now Gunness). More recently, two more collections of this grass have been made, one from Meripah in 1987 and the other from Batavia Downs in 1990. In my Australian grass key (Simon 1990) I indicated this species by *Panicum* sp. Morton 191, although the collector's number should have been cited as 1191. The distinctive character of the absolute disarticulation of the panicle at the base of all the branches as well as beneath the spikelets, necessitates the species be placed in the genus *Arthrargrostis* Lazarides.

Arthrargrostis clarksoniana B. Simon, sp. nov. *A. deschampsii* (Domin) Lazarides affinis, sed gluma supera et gluma infero in longitudine aequali plus minusve et pilis tuberculatis differt. **Typus:** Queensland. COOK DISTRICT: 16 km from Meripah homestead on road to the south, 13°49'S 142°22'E, 11 May 1987, J.R. Clarkson 7149 & B.K. Simon (holo: BRI(AQ 452649); iso: MBA, NSW). **Fig. 1.**

Weak annual. Culms erect or basally decumbent, weakly tufted, 40-60 cm tall, sparingly branched at base, 2-4-noded, terminated by a solitary, large and open inflorescence about half the length of the culm. Internodes longer than the associated leaf sheaths which are rounded on the back. Ligule a fringed membrane c. 0.5 mm long. Leaf blades lanceolate, flat, 3-10 cm × 20 mm, pilose, margins smooth with scattered tubercle-based hairs. Inflorescence a panicle with main axis 23-30 cm long and smooth. Primary branches spreading, not whorled, 10-21 cm long, scabrous on the margins. Pedicels 2-12 mm long, distinctly angled, straight, scabrous although with glabrous apices. Callus not differentiated. Spikelets abaxial, 15-25 on a typical lowermost primary branch, dorsiventrally compressed, ovate or elliptic in outline, 3.5-4.0 × c. 1.5 mm. Glumes ± equal, 3.5-4.0 mm long; lower glume, ovate or elliptic in outline, acuminate, 5-7-nerved, membranous, hairy with tubercle-based cilia scattered over the back on the lower two-

*continued from Austrobaileya 3(1): 79-99 (1989)

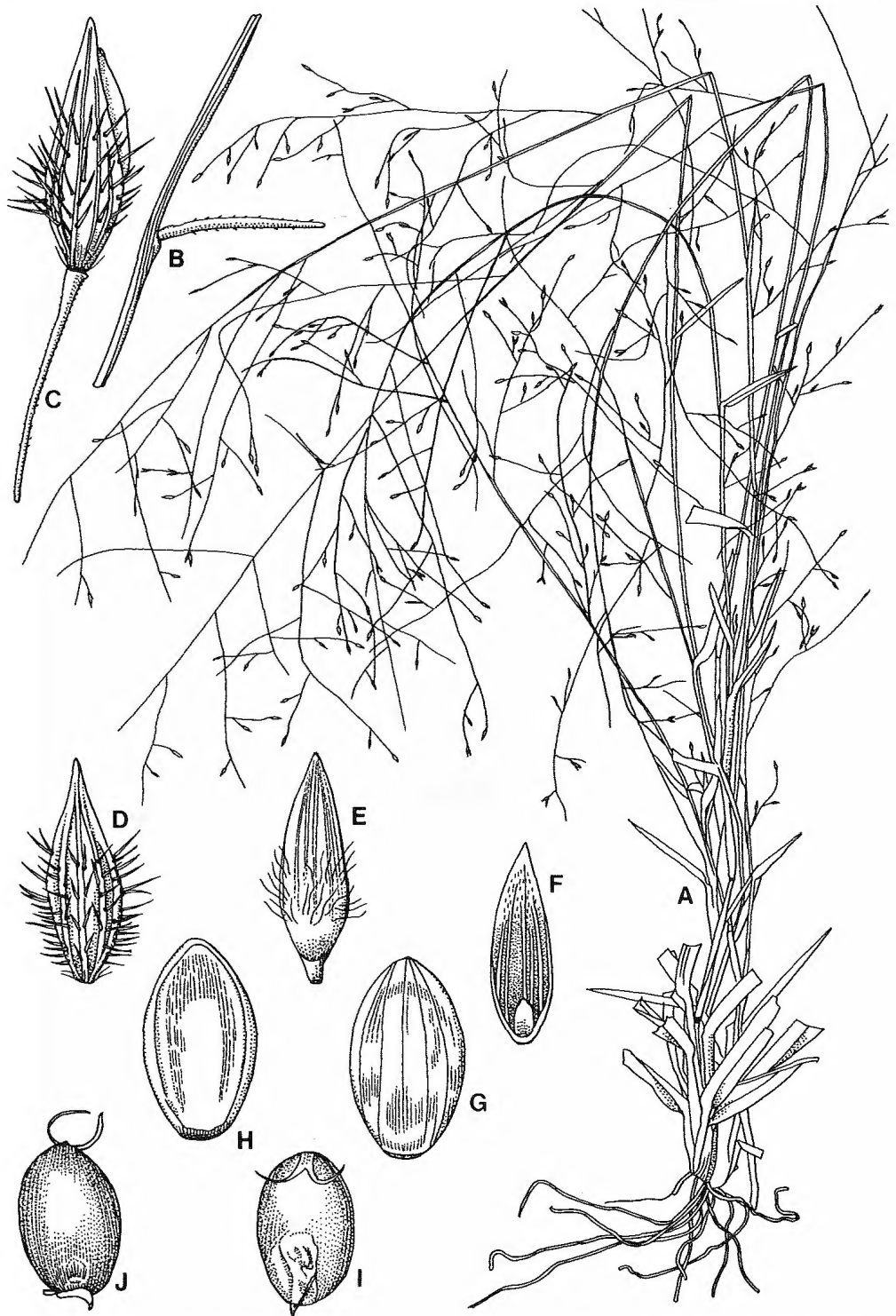


Fig. 1. *Arthrargrostis clarksoniana*: A. plant $\times 0.5$. B. base of primary branch, showing disarticulation. C. spikelet. D. lower glume, back view. E. upper glume, back view. F. lower floret with minute palea within lemma. G. upper floret, back view. H. upper floret, front view. (B-H $\times 8$). I. caryopsis, view of side with embryo. J. caryopsis, view of side with hilum. (I, J $\times 16$). From type specimen.

thirds; upper glume narrowly elliptic in outline, 7–9-nerved, membranous, hairy with tubercle-based cilia scattered over the back on the lower two-thirds. Rachilla conspicuous between the glumes. Lower lemma elliptic in outline, acute, membranous, glabrous, 3.0–3.5 mm long. Palea of lower floret vestigial, apically truncate. Upper floret perfect, elliptic in outline, shorter than the lower floret. Upper lemma c. 1.5 mm long, yellow, chartaceous, smooth and shiny, rounded on the back, glabrous. Palea of upper floret chartaceous, smooth. Caryopsis c. 1.5 mm long with hilum about half as long as caryopsis.

Specimens examined: Queensland. COOK DISTRICT: York Downs on Myall Creek, 12°45'S, 142°18'E, *Eucalyptus tetrodonta* – *E. confertiflora* grassy open forest, May 1981, Morton 1191 (BRI); Batavia Downs, 12°40'S, 142°40'E, fenced areas around homestead and yards, Apr 1990, Clarkson 8590 & Neldner (BRI, MBA).

Conservation status: 3K (Briggs & Leigh 1988).

Etymology: The species is named for John Clarkson, Queensland Herbarium Senior Botanist at Mareeba. He has enthusiastically collected much interesting botanical material from north Queensland and who has provided me hospitality, facilities and access to remote areas of Cape York on a number of occasions.

Notes: Although the presence of a lower palea for this genus was originally recorded by Domin (1915, under *Panicum deschampsoides*), it has not been mentioned in more recent papers (Lazarides 1984; Simon 1986). However it is present as a very small vestigial membrane in specimens of both *Arthrargrostis clarksoniana* and *A. deschampsoides*. The glumes in *A. clarksoniana* differ from those in the other species in being of more or less equal length, although previously reported as having the lower glume longer than the upper (Simon 1990). In some spikelets the lower glume may be slightly longer than the upper glume, but in others the lower glume may be slightly shorter than the upper.

Brachiaria (Trin.) Griseb.

A state of instability exists regarding the taxonomic status of the genera *Urochloa* P. Beauv. and *Brachiaria* (Trin.) Griseb. The classical difference between these genera is whether the spikelet orientation is adaxial (with the lower glume adjacent to the inflorescence axis), the general situation in *Brachiaria* and some panicoid genera, or abaxial (with the lower glume remote from the inflorescence axis) in *Urochloa* and most other panicoid genera. To a lesser extent, the possession of a racemose inflorescence distinguishes *Brachiaria* from other panicoid genera. Both these characters cannot be universally applied, however, and the position regarding the taxonomic value of these characters is summarised in the relevant literature (Chase 1911, 1920; Hughes 1923; Gardner & Hubbard 1938; Blake 1958; Hsu 1965; Parodi 1969; Sendulsky 1978; Zuloaga & Soderstrom 1985; Clayton & Renvoize 1986).

Blake (1958) presented a good summary of the taxonomic history of this group of genera.

“Bentham (1878, 1883) treated under *Panicum* several groups that had been proposed as distinct genera by earlier authors, including all *Brachiaria* and *Urochloa*. Later Chase (1906–11) investigated the diagnostic value of the texture of the upper lemma and the nature of its margins as well as the orientation of the spikelets; she showed that these characters were so correlated with others that some of the groups previously proposed as genera could be sharply redefined as such. Most botanists soon accepted Chase's principles for generic discrimination and new genera were described by Stapf (1917–1930) and others. Some of these genera (*Paspalidium*, *Entolasia*, and *Ottochloa* among others) were not accepted by Chase (1939, 1951 etc.), Hitchcock (1936a, 1936b etc.) or Reeder (1948), all of whom referred the species they dealt with to *Panicum*. These authors and Pilger (1940) treated under *Panicum* (*Panicum* sect. *Fasciculata* Hitch. & Chase or *Panicum* subgen. *Urochloides* Pilger) a group of species referred partly to *Brachiaria* and partly to *Urochloa* by Stapf (1917–1930) and Hughes (1923), and to *Brachiaria* by Gardner and Hubbard (1938).”

In a manuscript of the Paniceae for A. Engler's Pflanzenreich, recently distributed from Berlin (B), Mez placed *Brachiaria*, *Urochloa* and *Eriochloa* in *Panicum* subgenus *Brachiaria* (Griseb.) Benth. & Hook.

Brachiaria was originally described as a section of *Panicum* by Trinius (1826) and elevated to generic rank by Grisebach (1853), but neither author indicated the characters by which the taxon could be distinguished. In Trinius's section were four species with reversed (adaxial) spikelets among others with normal (abaxial) spikelets. As Grisebach only mentions *Brachiaria eruciformis* in his treatment, the type of this name is the nomenclatural type of the generic name. He specifically describes the racemose primary branches but not the adaxial spikelets.

Further taxonomic history of the genus is documented by Webster (1987).

"In 1903 Nash, working on the grasses of the southeastern United States, recognised the adaxial orientation of the spikelets and transferred some *Panicum* species to *Brachiaria*. Stapf (1919) in 'Flora of Tropical Africa' used the presence of racemose primary branches as the distinguishing feature of *Brachiaria* and transferred numerous species from *Panicum*. The American authors, Chase and Hitchcock made additional combinations in *Brachiaria*, whereas [Gardner and] Hubbard (1938) and Hughes (1923) named many of the Australian species in *Brachiaria*. These various authors used the racemose primary branches and spikelet orientation to distinguish *Brachiaria* from *Panicum*. Chase (1920) states that *Brachiaria* spikelets are adaxial whereas *Panicum* is abaxial and this character appears in the various keys produced by Hitchcock and Chase."

Blake (1969) transferred four American species of *Panicum* sect. *Fasciculata* to *Brachiaria*; two of these, however, had also been transferred to *Brachiaria* by Parodi (1969) and the combination published only days before Blake's account (Blake 1973). Butzin (1970), in a paper proposing a new subtribal classification of the tribe Paniceae, placed *Brachiaria* in the subtribe Brachiariinae, together with nine other genera, on the basis of the abaxial lower glume, whereas *Urochloa* was placed in the subtribe Paspalinae with 13 other genera on the basis of the adaxial lower glume. Shaw and Siemens (1980) point out the strong affinity between *Brachiaria*, *Eriochloa* and *Urochloa* on the basis of their all possessing the PEP-ck subtype of C_4 photosynthesis (Gutierrez, Gracen & Edwards 1974), and that *Urochloa* differs from the other two by the abaxial orientation of the lower glume and a basic chromosome number of $x = 10$ as opposed to $x = 9$ in *Eriochloa* and *Brachiaria*. However they also add the rider that the latter two characters may not be as significant in the classification of the Paniceae as previously thought.

There appears some dispute whether the lower glume in *Brachiaria* is universally adaxial. Establishing whether the lower glume is adaxial or abaxial in species with long pedicels is difficult, but Gardner and Hubbard (1938) explained a method to overcome this which was summarised by Zuloaga and Soderstrom (1985).

"They suggested that the spikelet just below the terminal one on the axis or on a branch of the panicle be examined to determine the position of the lower glume, because the spikelet is generally short-pedicelled and appressed to the rachis. They commented that the orientation is still occasionally unclear due to suppression or rudimentary development of the lower spikelet of the pair, in which case the terminal spikelet appears to be solitary and in an abaxial position."

Webster (1987), however, implied that this anomaly of spikelet orientation in some of the spikelets of *Brachiaria reptans* is sufficient for the character to lose its significance. It is a reason, considered with other characters, for his placing all Australian species of *Brachiaria*, excluding *B. eruciformis*, in *Urochloa*. However Clayton and Renvoize (1986), while accepting the taxonomic proximity of *Brachiaria*, *Urochloa*, *Eriochloa* and *Panicum*, did not emphasise spikelet reversal in their comparisons but mentioned arbitrary characters such as 'spikelet plumpness' in *Brachiaria* and 'plano-convex shape, cuspidate tip and mucronate upper lemma' in *Urochloa*. However, under *Urochloa*, they stated that "when the spikelets are paired their orientation becomes ambiguous and diagnosis then rests upon their facies. Unfortunately orientation and facies are not wholly correlated, some intermediates being noted under *Brachiaria*, and it is a moot point whether generic rank is justified."

However, the recent transfer of most species of *Brachiaria* and *Panicum maximum* to *Urochloa* by Webster (1987, 1989) and Webster *et al.* (1988, 1989) on the basis of morphological (the possession of rugose rather than smooth fertile lemmas, the spikelet disarticulating at the spikelet base as opposed to above the glumes, and the apex of the upper floret being mucronate to awned rather without mucros or awns) and anatomical (leaf anatomy associated with the PEP-ck biochemical variant of C_4 photosynthesis) characters, is probably premature as Ellis (1988) pointed out "the correlation between PEP-ck type anatomy with centrifugal chloroplasts and panicoid grasses with rugose lemmas is not perfect and that some species with smooth shiny lemmas also belong to this complex." Furthermore the placing of *Eriochloa*, on the basis of its similar leaf anatomy and the lemmas being finely pitted or ridged (Chippindall 1955), in the same group as *Brachiaria*, *Urochloa* and *Panicum maximum* is not followed by Webster. The transfer of most Australian species of *Brachiaria* to *Urochloa* has been accepted by some botanists (Kenneally 1989; Wheeler, Jacobs & Norton 1990; Hnatiuk 1990; Wheeler in press) and the transfer of *Panicum maximum* to *Urochloa* has been accepted by Hnatiuk (1990) and Wheeler (in press) but not by Wheeler, Jacobs and Norton (1990). Watson and Dallwitz (1988), although appearing to agree with the transfer, do not actually accept it. Under *Brachiaria* they made the comment "all but the type species arguably best referred to *Urochloa*," and under *Urochloa* "unsatisfactorily delimited from other close allies of *Panicum*, in particular *Brachiaria*." However, in terms of their 'nearest neighbours' analysis, *Urochloa* is listed as only the fourth closest relative to *Brachiaria* under the treatment of *Brachiaria*, although *Brachiaria* is listed as the closest to *Urochloa* under the treatment of *Urochloa*. Thompson and co-workers (Thompson & Estes 1986; Thompson 1988; Thompson, Tyrl & Estes 1990) have refrained from making generic transfers but indicate that within the *Brachiaria* group of Brown (Gutierrez, Edwards & Brown 1976; Brown 1977), *Brachiaria* (including *Panicum* sect. *Fasciculata*), *Eriochloa* and *Urochloa* appear to constitute a monophyletic group. However they did not mention *Panicum maximum* as a member of the *Brachiaria* group, although included there by Brown and regarded by others as a candidate for generic transfer to the *Brachiaria* group on the basis of its rugose lemmas and PEP-ck anatomy (Ellis 1977; Hattersley 1987; Zuloaga 1987). Until a complete cladistic analysis is undertaken on all member species of the group it is probably better to leave the classification as it is.

Prior to Webster's work a few species of *Brachiaria* had been placed in or transferred to *Urochloa*. Names provided for them in *Urochloa* are *U. reptans* (L.) Stapf (Stapf 1920), *U. gilesii* (Benth.) Hughes and *U. praetervisa* (Domin) Hughes (Hughes 1923), and *U. mutica* (Forssk.) Nguyen, *U. kurzii* (J.D. Hook.) Nguyen and *U. ramosa* (L.) Nguyen (Nguyen 1966). The latter two combinations were superfluously made again by Webster. Thompson (1988) retained in *Brachiaria* the Australian species transferred by Webster to *Urochloa* except *Urochloa gilesii* and *U. reptans*, but I am retaining both of these in *Brachiaria* as the lower glume in both of these species is for the most part adaxial.

I am recognising *Brachiaria* in the classical sense pending results of cladistic work on the whole complex. Names are thus required in *Brachiaria* for taxa described by Webster for the first time in *Urochloa*.

***Brachiaria atrisola* (R. Webster) B. Simon, comb. nov.**

Urochloa atrisola R. Webster, The Australian Paniceae (Poaceae) 232 (1987). **Typus:** Northern Territory. Barkly Tableland, 17°20'S, 135°45'E, undulating *Astrebla* grassland, grey pedocalcic soil, 14 May 1947, S.T. Blake 17776 (holo: BRI(BRI 186629)(AQ 256724); iso: BRI(BRI 065747), CANB, DNA, K, MO). **Fig. 2.**

Additional specimens examined: Northern Territory. BARKLY TABLELANDS: SW of Brunette Downs, dry bed of Lake Sylvester, May 1947 Blake 17830 (BRI, DNA). Queensland. BURKE DISTRICT: 30 miles [48 km] S of Julia Creek, Mitchell grass downs, Mar 1959, Sillar 8 (BRI); Galway Downs, Hughenden, Mar 1933, Kirby s.n. (BRI, K, L, NSW).

Conservation status: Although the species does not appear threatened, I am aware of only four collections of it and therefore it should be placed in the category 3K (Briggs & Leigh 1988).

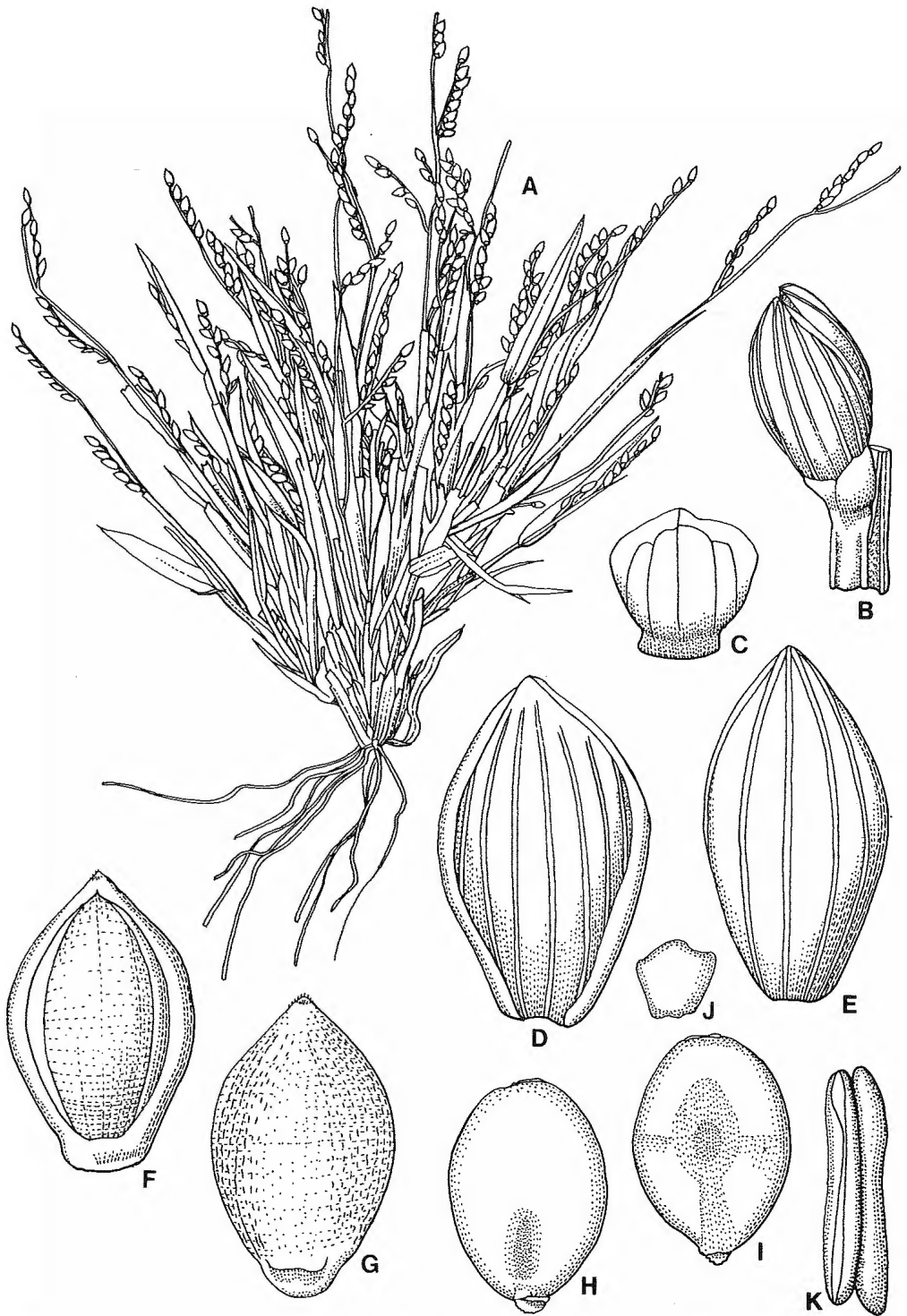


Fig. 2. *Brachiaria atrisola*: A. habit $\times 0.7$. B. spikelet showing adaxial position of lower glume $\times 8$. C. lower glume, back view. D. upper glume, front view. E. lower lemma, back view. F. upper floret, front view. G. upper floret, back view. H. caryopsis, view of side with hilum. I. caryopsis, view of side with embryo. J. lodicule. (C–J, $\times 12$). K. anther $\times 25$. From type specimen.

Etymology: Named for the black soils from which this species has been collected.

Notes: This species is represented only by four collections from the black-soil region of the Barkly Tableland of the Northern Territory and the adjacent parts of Queensland. According to Webster (1987) "it is morphologically similar to the glabrous form of *Urochloa* (*Brachiaria*) *piligera* but has a rounded apex on the second glume and lower lemma, turgid spikelets, relatively larger spikelets and lacks the distinct callus at the base of the spikelet."

Brachiaria holosericea* subsp. *velutina* (R. Webster) B. Simon, **comb. nov.*

Urochloa holosericea Webster subsp. *velutina* R. Webster, The Australian Paniceae (Poaceae) 240 (1987). **Typus:** Northern Territory. CENTRAL NORTH DISTRICT: Yeundumu Aboriginal Reserve, 22°10'S, 131°48'E, P.K. Latz 1979 (holo: CANB, n.v., *fide* Webster *loc. cit.*)

Specimens examined (All BRI; other herbaria cited where there are duplicates there): **Northern Territory.** DARWIN AND GULF: Near Balbirini Creek, May 1947, *Blake* 17740; Katherine, Feb 1947, *Miles* s.n. **CENTRAL NORTH:** Mt Doreen Station, Jan 1972, *Latz* 2046 (DNA). **BARKLY TABLELAND:** 35 miles [56 km] N of Newcastle Waters, Feb 1969, *Must* 406 (DNA). **Queensland.** COOK DISTRICT: 22 km W of Georgetown, Apr 1973, *Henderson* H1747; The Lynd, Feb 1968, *Horsup* 6; near Lynd Station, Feb 1954, *Lazarides* 4163. **BURKE DISTRICT:** Paroo Range N of Mt Isa, Jan 1990, *Harris* 434; Chudleigh Park, Feb 1931, *Hubbard* 7608 & *Winders* (K); ditto, *Hubbard* 7674 & *Winders* (K); Settlement Creek, Mar 1923, *Brass* 312; Poison Creek N of Hughenden, Apr 1935, *Blake* 8609; Adel's Grove, Camooweal, Mar 1947, *de Lestang* 302, 355; 14 miles [22.4 km] N of Mt Sturgeon, Jun 1953, *Lazarides* 3666 (CANB); 88 miles [141 km] E of Camooweal, Feb 1937, *Everist* 189 & *Smith*; Normanton, May 1935, *Blake* 9044. **NORTH KENNEDY DISTRICT:** Warrigal Creek, Jun 1980, *Rebgetz* 422, near Burdekin and Bogie Rivers, Oct 1950, *Blake* 18690; Heathfield, Aug 1942, *Smith* T78; Milray, Oct 1935, *Blake* 9964; Pentland, Apr 1935, *Blake* 8375; Ayr Beach, *Michael* s.n. **MITCHELL DISTRICT:** Prairie, Feb 1931, *Hubbard* 7034 & *Winders* (K); Aramac-Torrens Creek Road, Jun 1977, *McDonald* 2622; Geera, Nov 1935, *Blake* 10330; E of Jericho, Feb 1931, *Hubbard* 7834 (K).

Etymology: Named for the velutinous leaves.

Notes: Webster (1987) stated that this subspecies "occurs in the arid and semiarid areas of north central Australia, whereas subspecies *holosericea* occurs north of this area in tropical and subtropical subhumid woodlands. Morphologically, it differs from the typical subspecies in possessing velutinous leaves, fewer and shorter hairs on the inflorescence branches and pedicels, and generally longer awned lower lemmas." Examination of the Queensland Herbarium material revealed that about half the material previously placed unsorted under *Brachiaria holosericea* actually belongs in *B. holosericea* subsp. *velutina*.

***Brachiaria distachya* (L.) Stapf**

For some time confusion has existed concerning the correct application of the names *Brachiaria distachya* (L.) Stapf, *B. miliiformis* (Presl) Chase and *B. subquadriflora* (Trin.) Hitchc. Although these names have been regarded as applying to one species in the Malaya Peninsula (Gilliland 1971), the entity with smaller spikelets and a shorter inflorescence axis with fewer racemes, has been generally recognised as *B. distachya* (Jansen 1953; Bor 1960; Morat 1981; Clayton & Renvoize 1982). Regarding the other two names some authorities (Henrard 1950; Jansen 1953; Morat 1981) have synonymised *B. miliiformis* with *B. subquadriflora* while others (Bor 1960; Blake 1948; Vickery 1961) have recognised both as applying to separate species. The case presented by Jansen (1953) for uniting these species is convincing to me in that a comparison of the drawing of a spikelet of *B. subquadriflora* in Henrard (1950) with that of a spikelet on the type of *Panicum miliiforme* (the basionym of *B. miliiformis*) in Lamson-Scribner (1899) shows them to be almost identical. The drawing of a spikelet on the type of *Panicum subquadriflorum* (the basionym of *B. subquadriflora*) in Trinius (1829) also seems very similar to that of *Panicum miliiforme* in Lamson-Scribner (1899). As described and illustrated the types of both these names are annuals. Both types also show the presence of a lower palea, whereas it appears to be absent in many other specimens of this species examined.

In tropical Australia and Asia there is a decumbent species, referred to in Simon (1990) as *B. sp.* *Everist* 5112, which has for some time been confused with *B. subquadriflora* due to its very similar, but smaller spikelets. Because of its habit and the possibility that it could have some economic potential as a sward grass, I had been of the opinion it should be formerly recognised. All the specimens of this species have the lower palea

present and I was of the opinion this could be used as a supplementary morphological character to differentiate it from *B. subquadriflora* till my recent discovery of the presence of a lower palea in some specimens of the latter, including the types of both *Panicum miliiforme* and *P. subquadriflorum*. An examination of the microfiche of the type of *Panicum distachyon* in the Linnean herbarium (LINN) and specimens of *Brachiaria distachya* from India matched by C.E. Hubbard with the type (*Gamble* 17629 and *Drummond* 21156, both K with cibachrome photographs in BRI), has brought me to the conclusion that the decumbent sward-forming species referred to above, is in fact this species, although the inflorescence tends to be larger in some of the Australian material than the Indian specimens seen. Whereas the names *Panicum distachyum* (Bentham 1878), or *Brachiaria distachya* (Hughes 1923) have been used in earlier times for an Australian grass species, they have been used for a broad concept of it that includes *Brachiaria subquadriflora*. This is similar to what was done for the taxon on the Malaya Peninsula more recently (Gilliland 1971). C.E. Hubbard was of the opinion in 1933 that "true *B. distachya* does not occur in Australia" in a memorandum on *Brachiaria subquadriflora* sent to the Queensland Herbarium and Webster (1987) did not include *B. distachya* in his treatment of the Australian Paniceae. However there are a fairly large number of specimens in BRI which can be referred to *Brachiaria distachya*. There are a few records of this species from outside Australia in BRI, including some from New Caledonia and Fiji, where it has previously been thought not to occur (Morat 1981; Toutain 1989; Parham 1979) but the specimens cited below belong to this species rather than *B. subquadriflora*, where they were previously placed.

Specimens examined (All BRI; other herbaria cited where there are duplicates there): Sri Lanka. Chenkaladi, Dec 1974, *Davidse* 8997 & *Sumithraarachchi* (MO); Paranthan, Dec 1974, *Davidse* 9129 & *Sumithraarachchi* (MO). New Guinea. PORT MORESBY PROVINCE: Nebiri Quarry, Apr 1970, *Gebo* UPNG 96. WESTERN PROVINCE: Mabaduan, Jun 1973, *Henty* NGF 49601. BOUGAINVILLE PROVINCE: Kieta, Oct 1969, *Henty* NGF 42711. Australia. Northern Territory. DARWIN AND GULF: Vanderlin Island, Aug 1988, *Latz* 11063 (CANB,DNA); Adelaide River, Aug 1946, *Blake* 16704. Queensland. COOK DISTRICT: Thursday Island, Apr 1931, *Hockings* [AQ 255899]; Cairns, Jun 1930, *Hill* [AQ 255903]; Low Island, Great Barrier Reef, Jun 1969, *Done* [AQ 8175]; Mareeba, Apr 1983, *Clarkson* 4593 (QRS,DNA,PERTH), Jun 1963, *Veurman* [AQ 255900]; Bamaga, May 1981, *Alcorn* 8144, 8145; Yorkeys Knob, Apr 1962, *McKee* 9024; Gordonvale, Oct 1935, *Blake* 9853; Babinda, Mar 1973, *Henderson* H532; Cooktown, Apr 1973, *Henderson* H1602; South Johnstone, Apr 1938, *Langdon* 23; ditto, Jun 1963, *Bailey* 1; Daradgee, Jun 1936, *Goodman* s.n.; Kamarunga, May 1952, *Everist* 5112; Mornington Island, Sep 1981, *Fosberg* 62164; Freshwater, Mar 1938, *Blake* 13349; Bizant, Lakefield National Park, May 1987, *Clarkson* 6953 & *Simon*; Clifton Beach, Feb 1985, *Lear* s.n. [AQ 396685]; Corduroy Creek, Feb 1983, *Steel* 355. NORTH KENNEDY DISTRICT: Dingo Beach, Apr 1978, *Simon* 3386; Trebonne, Hinchinbrook, May 1986, *Steel* [AQ 440235]; Clark River Telegraph Station, Jul 1954, *Blake* 19436; Euramo, Mar 1961, *Saint-Smith* s.n.; Townsville, Jun 1975, *Burmeister* s.n.; Little Crystal National Park, May 1975, *Simon* 2621 & *Andrews*; Pettrides Bridge, May 1975, *Simon* 2644 & *Andrews*; Saunders Beach, Apr 1975, *McDonald* 1444 & *Batianoff*. SOUTH KENNEDY DISTRICT: Mackay, Apr 1975, *McDonald* 1301 & *Batianoff*. PORT CURTIS DISTRICT: Emu Park, May 1975, *Simon* 2559 & *Andrews*. Vanuatu. Erromanga, May 1928, *Kajewski* 278; Tanna, Jun 1978, *Morat* 6011, 6022. New Caledonia. La Roche percee, Apr 1967, *Schmid* 1995 (NOU); Lifou, May 1969, *Schmid* 2829 (NOU); I.F.O. Anse Vata, Jun 1963, *Blanchon* 179 (NOU). Fiji. Naitonitoni, Serua, Aug 1954, *Shradha Nand* 8652.

Cyrtococcum Stapf

Cyrtococcum is a genus of 12 species native to the Old World tropics and its diagnostic features include the lateral compression of the spikelets, a crested apex on the upper lemma and a gibbous second glume and upper lemma. Until now only one species, *C. oxyphyllum* (Steudel) Stapf, has been recorded from Australia and that from the rainforests of north Queensland with a range extending to the tropics of Malesia, Melanesia and Asia. However John Clarkson and John Neldner, Queensland Herbarium Senior Botanists stationed at Mareeba, recently conducted a survey of the Batavia Downs region of Cape York Peninsula and among their collections was a delicate new species of *Cyrtococcum*.

***Cyrtococcum capitis-york* B. Simon, sp. nov.** *C. deccanensi* Bor affinis sed spiculis parvioribus, *C. patenti* (L.) A. Camus affinis, sed spiculis grandioribus et paucioribus differt. **Typus:** Queensland. COOK DISTRICT: 10.8 km S of Batavia Downs on Peninsula Development Road, 21 April 1990, *J.R. Clarkson* 8477 & *V.J. Neldner* (holo: BRI(AQ 463916); iso: B,BRI,DNA,NSW). **Fig. 3.**

Culms stoloniferous, basally decumbent, not tufted, 15–30 cm tall, 7–9-noded, sparingly branched, terminated by a solitary inflorescence. Internodes longer than the associated leaf sheaths. Sheaths slightly compressed and markedly ribbed. Ligule a membrane, c. 0.4 mm long. Leaf blades flat, lanceolate, 2.5–7.0 cm × 3–5 mm, glabrous, sparsely



Fig. 3. *Cyrtococcum capitis-york*: A. habit $\times 0.6$. B. spikelet, lateral view $\times 16$. C. lower glume, back view. D. upper glume, front view. E. lower lemma, back view. F. upper lemma, lateral view. G. upper palea, lateral view. (D-G, $\times 25$). From type specimen.

pubescent adaxially, with scabrous margins. Inflorescence a panicle with main axis 2–8 cm long, smooth or rough. Primary branches spreading, not whorled, c. 4 cm long, smooth on the margins. Pedicels 2–5 mm long, distinctly angled, smooth, straight or twisted. Disarticulation at the base of the spikelet. Spikelets abaxial, c. 10 on a typical lowermost primary branch, laterally compressed, obliquely obovate in outline, 1.5–1.7 × 0.8–1.0 mm. Lower glume triangular or ovate, 0.6–0.8 mm long, 3-nerved, membranous, scabrous, setose with hairs tubercle-based. Upper glume obovate, c. 1.5 mm long, 3-nerved, rounded on the back, membranous, hairy with tubercle-based hairs. Rachilla not conspicuous between the glumes. Lower lemma obovate, membranous, hairy, overtopping the spikelet, acute or rounded apically. Palea of lower floret absent. Upper floret perfect, shorter than the lower floret. Upper lemma white, softly cartilaginous smooth, gibbous, navicular, rounded on the back, glabrous, apically rounded. Palea of upper floret softly indurate, smooth. Anthers c. 1 mm long. Caryopsis not seen.

Conservation status: 1K (Briggs & Leigh 1988).

Etymology: Named for Cape York.

Notes: *Cyrtococcum capitis-york* is very close to *C. deccanense* Bor, itself a distinctive species with local distributions in India and Sri Lanka (Bor 1960), but has slightly smaller spikelets (1.5–1.7 mm long compared to 1.8–2.0 mm long in *C. deccanense*) in which its hairs are tubercle-based. Both these species have a sparse inflorescence of relatively few spikelets compared to that of *C. patens* (L.) A. Camus with a dense inflorescence of many spikelets, a species relatively widespread in southeast Asia with which *C. deccanense* was compared when it was described. These three species all have hairy spikelets.

Panicum L.

Panicum is the largest genus in the grass family with recent estimates figures ranging from ± 470 species (Clayton & Renvoize 1986) to ± 600 species (Zuloaga 1987). As circumscribed last century the genus was even larger, but it was divided into smaller genera on the basis of well-defined morphological characters in the early part of this century by Chase (1906–1911) for the New World species and by Stapf (1917–1930) for the African species. Hughes (1923), working on the Australian species and following the example set by Stapf for Africa, divided Bentham's genus *Panicum* in his *Flora Australiensis* (1878) into 14 genera, leaving 22 species in *Panicum*. However *Panicum* is still a very variable genus and, together with its allied genera, is in need of critical revision at world level to make sense of this variability (Brown 1977). Nevertheless three Australian species of *Panicum*, two of them recognised in Simon (1990) as *Panicum* species and one as a species of *Yakirra*, require formal description.

***Panicum bombycinum* B. Simon, sp. nov.** *P. decomposito* R. Br. affinis, sed glumis inferis multis longioribus et foliis bombycinis, *P. queenslandico* Domin affinis, sed spiculis brevioribus et foliis bombycinis differt. **Typus:** Queensland, SOUTH KENNEDY DISTRICT, 27 km W of Mirtna HS, 21°18'46"S, 145°57'47"E, open savanna woodland, recently burnt, dominated by *Eucalyptus whitei*, with *E. papuana* and *E. brachycarpa* on sandy soil, 6 April 1992, E.J. Thompson BUC 1418 & B.K. Simon (holo: BRI(AQ560012); iso: AD,B,BRI,CANB,DNA,K,L,MEL,MO, NSW,PERTH,US).

Plants perennial. Culms erect, tufted, to 35 cm tall, 2–4-noded, unbranched, terminated by a solitary inflorescence. Internodes shorter than the associated leaf sheaths. Sheaths rounded on the back. Ligule a fringe of hairs c. 1.5 mm long. Leaf blades linear, flat or involute, 9–21 cm × 2–4 mm, hairy, sericeous with scaberrulous margins. Inflorescence a panicle with main axis to 12 cm long, scabrous. Primary branches spreading, to 6 cm long, scabrous on the margins. Pedicels 5–20 mm long, distinctly angled, scabrous, straight. Disarticulation at the base of the primary branches. Spikelets abaxial, 3–5 on a typical lowermost primary branch, dorsiventral compressed, ovate in outline, 3.0–3.5 × 1.0–1.5 mm. Lower glume triangular, acute, 1.7–2.0 mm long, 5- sub 7-nerved, membranous, smooth, glabrous. Upper glume ovate, 3.0–3.5 mm long, 9- sub 11-nerved, rounded on the back, membranous, glabrous. Rachilla not conspicuous between the

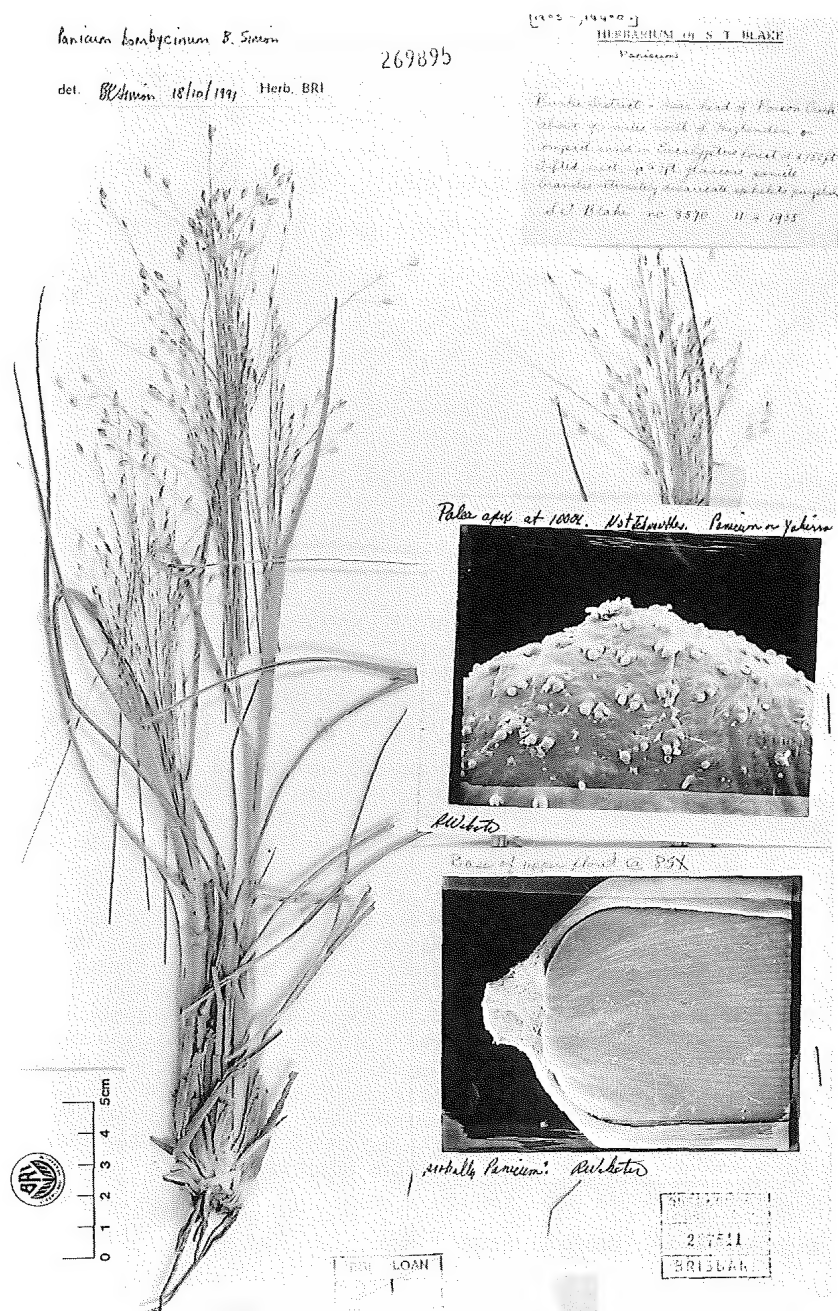


Fig. 4. *Panicum bombycinum*.

glumes. Lower lemma ovate, 3.0–3.5 mm long, membranous, glabrous, acuminate. Palea of lower floret vestigial, ovate, acute. Upper floret perfect, shorter than the lower floret. Upper lemma elliptic, 2.0–2.3 mm long, apically rounded, brown, coriaceous, smooth, rounded on the back, glabrous. Palea of upper floret coriaceous, smooth. Anthers c. 1.5 mm long. Caryopsis not seen. **Fig. 4.**

Additional specimens examined. Queensland. BURKE DISTRICT: near head of Poison Creek, about 90 ml [144 km] N of Hughenden, on compact sand in *Eucalyptus* forest, Apr 1945, *Blake* 8540 (**Fig. 4**); SOUTH KENNEDY DISTRICT: 14.5 km SW of Mirtna on shot-line 35 km NW of Mirtna-Yarromere road, Apr 1992, *Thompson* BUC 146 & *Simon* (BRI,MBA).

Conservation status: 3K (Briggs & Leigh 1988).

Etymology: Named for the silky, velvety hairs covering the leaf sheaths and blades.

Notes: *Panicum bombycinum* is distinctive of the Australian species of *Panicum* in that its leaf sheaths and blades have a dense covering of silky, velvety hairs. It differs also from *P. decompositum* by its longer lower glume (1.7–2.0 mm long compared to 0.5–1.0 mm long in *P. decompositum*) long and differs from *P. queenslandicum* by its shorter spikelets (3.0–3.5 mm long compared to 3.5–5.0 mm long in *P. queenslandicum*). The spikelets thus appear plumper as they have the same width as the spikelets of *P. queenslandicum* (1.0–1.5 mm wide).

Because this species was originally thought to have an appendage at the base of the fertile, upper floret it was placed with *Yakirra* (as *Yakirra* sp. *Blake* 8570) in *Simon* (1990), but closer examination (**Fig. 4**) revealed it to have no such appendage. Furthermore the rachilla between the glumes is not conspicuous as in species of *Yakirra*, so the placement of this species in *Panicum* seems logical on the present evidence.

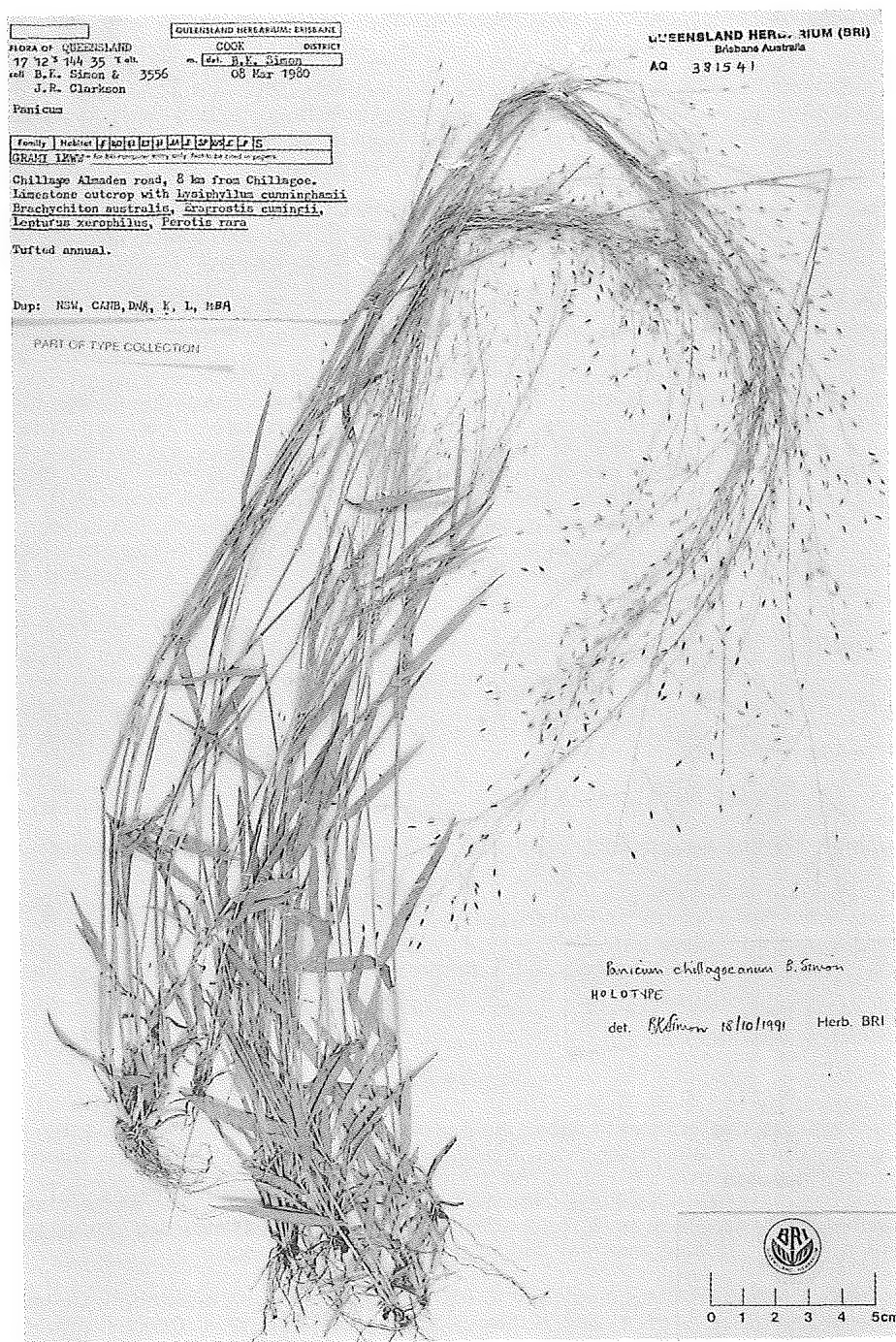
Panicum chillagoanum B. Simon, sp. nov. *P. seminudo* Domin affinis, sed spiculis brevioribus, *P. mitchellii* Benth. affinis, sed habitu annuo, habitans terram calcaream differt. **Typus:** Queensland. COOK DISTRICT: Chillagoe-Almaden road 8 km from Chillagoe, limestone outcrop, 8 March 1980, *B.K. Simon* 3556 & *J.R. Clarkson* (holo: BRI(AQ 381541); iso: BRI,CANB,DNA,K,L,MBA,NSW). **Fig. 5.**

Plants annual. Culms erect, tufted, 15–60 cm tall, 2–3-noded, unbranched, terminated by a solitary inflorescence. Internodes shorter than the associated leaf sheaths. Sheaths slightly compressed. Ligule a fringed membrane c. 1 mm long, with marginal tubercle-based hairs at the sheath blade junction. Leaf blades flat, linear or triangular, 2–12 cm × 2–5 mm, hairy with a few tubercle-based hairs along nerves, especially the midrib, with scaberulous margins. Inflorescence a panicle with main axis 4–25 cm long and smooth. Primary branches spreading, 3–14 cm long, scabrous on the margins. Pedicels 3–12 mm long, distinctly angled, scabrous, straight. Disarticulation at the base of the spikelet. Spikelets abaxial, 15–20 on a typical lowermost primary branch, dorsiventral compressed although laterally compressed at apex, lanceolate in outline, 2.1–2.7 mm × 0.8–1.0 mm. Lower glume triangular, 0.9–1.2 mm long, 5-nerved, acute, membranous, smooth, glabrous. Upper glume ovate, 2.1–2.7 mm long, 5-nerved, apically acuminate, rounded on the back, membranous, glabrous. Lower lemma ovate, slightly shorter than upper glume, membranous, glabrous, apically acuminate. Rachilla conspicuous between the glumes. Palea of lower floret vestigial, apically truncate. Upper floret perfect, shorter than the lower floret. Upper lemma oblong, c. 1.5 mm long, brown, chartaceous, smooth, rounded on the back, glabrous. Palea of upper floret chartaceous, smooth. Anthers c. 1.5 mm long. Caryopsis not observed.

Conservation status: 1K (Briggs & Leigh 1988).

Etymology: Named for the Chillagoe area, where it appears restricted.

Notes: *Panicum chillagoanum* differs from *P. seminudum* Domin by its smaller spikelets (2.1–2.7 mm long compared to 3.1–3.7 mm long in *P. seminudum*) and it differs from *P. mitchellii* Benth. by its annual habit and by its being restricted to limestone habitats of the Chillagoe area as opposed to *P. mitchellii* being perennial and occurring in non-calcareous wet sclerophyll forests and woodlands of north Queensland. This species has been collected only once, from a limestone outcrop in the Chillagoe area where it was

Fig. 5. Holotype of *Panicum chillagoanum*.

locally fairly common. In its endemism to this region of Queensland resembles other species such as *Atalaya calicicola* Reyn. (Sapindaceae) and *Glossocarya calicicola* Domin (Verbenaceae).

Panicum robustum B. Simon, *sp. nov.* *P. trachyrhachidi* Benth. affinis, sed spiculis longioribus, glumis inferis longioribus quam glumis superis differt. **Typus:** Queensland. NORTH KENNEDY DISTRICT: Brandy Creek road, 12 km from its source, 13 April 1978, *B.K. Simon* 3370, *J.R. Clarkson* & *N.B. Byrnes* (holo: BRI(AQ 344285); iso: BRI,CANB,DNA,K,L,MO,NSW). **Fig. 6.**

Plants robust annuals. Culms erect or sometimes basally decumbent, weakly tufted, 80–180 cm tall, 3–5-noded, sparingly branched or rarely unbranched. Internodes longer than the associated leaf sheaths. Sheaths rounded on the back. Ligule a fringed membrane c. 2 mm long. Leaf blades flat, linear, 10–35 cm × 5–10 mm, with a distinctive white midrib, hairy, hispid with tubercle-based hairs, and scabrous on margins. Inflorescence a panicle with main axis 25–40 cm long, very lightly scabrous. Primary branches spreading, 10–18 cm long, scabrous on the margins. Pedicels 2–4 mm long, distinctly angled, scabrous, straight. Disarticulation at the base of the spikelet. Spikelets abaxial, dorsiventral compressed, lanceolate in outline, 4.5–5.0 × c. 1 mm. Lower glume lanceolate, 4.5–5.0 mm long, 5–7-nerved, membranous, smooth, glabrous, acuminate. Upper glume lanceolate, 3.5–4.0 mm long, 5–7-nerved, rounded on the back, membranous, glabrous. Lower lemma lanceolate, 3.5–4.0 mm long, membranous, glabrous, apically acute. Rachilla conspicuous between the glumes. Palea of lower floret vestigial, cleft at the apex. Upper floret perfect, shorter than the lower floret. Upper lemma elliptic, c. 2 mm long, pale yellow, chartaceous, smooth, rounded on the back, glabrous, apically rounded. Palea of upper floret chartaceous, uniformly striate. Anthers c. 1.5 mm long. Caryopsis c. 2 mm long.

Specimens examined: Queensland. COOK DISTRICT: Laura River, Peninsular Development road, Apr 1983, *Clarkson* 4719 (BRI,CANB,K,QRS); Mareeba, Mar 1938, *Blake* 13479 (AD,BRI,CANB,DNA,K,L,MO,NSW,PERTH,PRE); Log Creek, 22 km W of Georgetown, Apr 1973, *Henderson* H1734 (BRI); Gilbert River crossing, 84 km WNW of Georgetown, Apr 1973, *Henderson* H1757 (BRI); Welcome Creek plateau, 13 km SSW of Battle Camp, via Cooktown, Jul 1990, *Bean* 1920 (BRI). BURKE DISTRICT: Poison Creek, near Mt. Sturgeon Station, Feb 1931, *Hubbard* 7726 & *Winders* (BRI,K). NORTH KENNEDY DISTRICT: Burdekin River, 30 km NW of Charters Towers, Apr 1978, *Simon* 3453 (BRI).

Conservation status: Not threatened (Briggs & Leigh 1988).

Etymology: Named for the large culm and spikelet dimensions.

Notes: *Panicum robustum* is a robust annual species of rainforest clearings and margins and wet sclerophyll forests and woodlands has been collected a number of times from north Queensland. Like *P. trachyrhachis* it has large spikelets at least 4 mm long, differing in this respect from *P. mindanaense* with its spikelets up to 3 mm long. It is distinguished from *P. trachyrhachis* by its spikelets being more than 4.5 mm long and by its lower glume being longer than the upper one.

Paspalum L.

Paspalum is a tropical to subtropical genus of ± 330 species (Clayton & Renvoize 1986), occurring mainly in the New World where they form an important component of the native grasslands. Of the 18 species recorded for Australia there are four fairly common native species (although the two hydrophytic species *P. distichum* and *P. vaginatum* are considered by Webster (1987) to be introduced) and two native species known from very limited material and which are described here.

Paspalum batianoffii B. Simon, *sp. nov.* *P. notato* Fluegge affinis, sed stolonibus, spiculis angustioribus, *P. multinodo* B. Simon affinis, sed stolonibus, spiculis longioribus, *P. vaginato* Sw. affinis, sed racemis et spiculis longioribus, rachidibus latioribus, differt. **Typus:** Queensland. PORT CURTIS DISTRICT: Statue Bay Beach, 6.5 km SE of Yeppoon, very narrow foredune with open woodland of *Casuarina*, *Hibiscus* and *Excoecaria* spp. and groundcover of *Panicum maximum*, *Ipomoea pes-caprae* and *Zoysia macrantha*; performing sand binding function just above high water

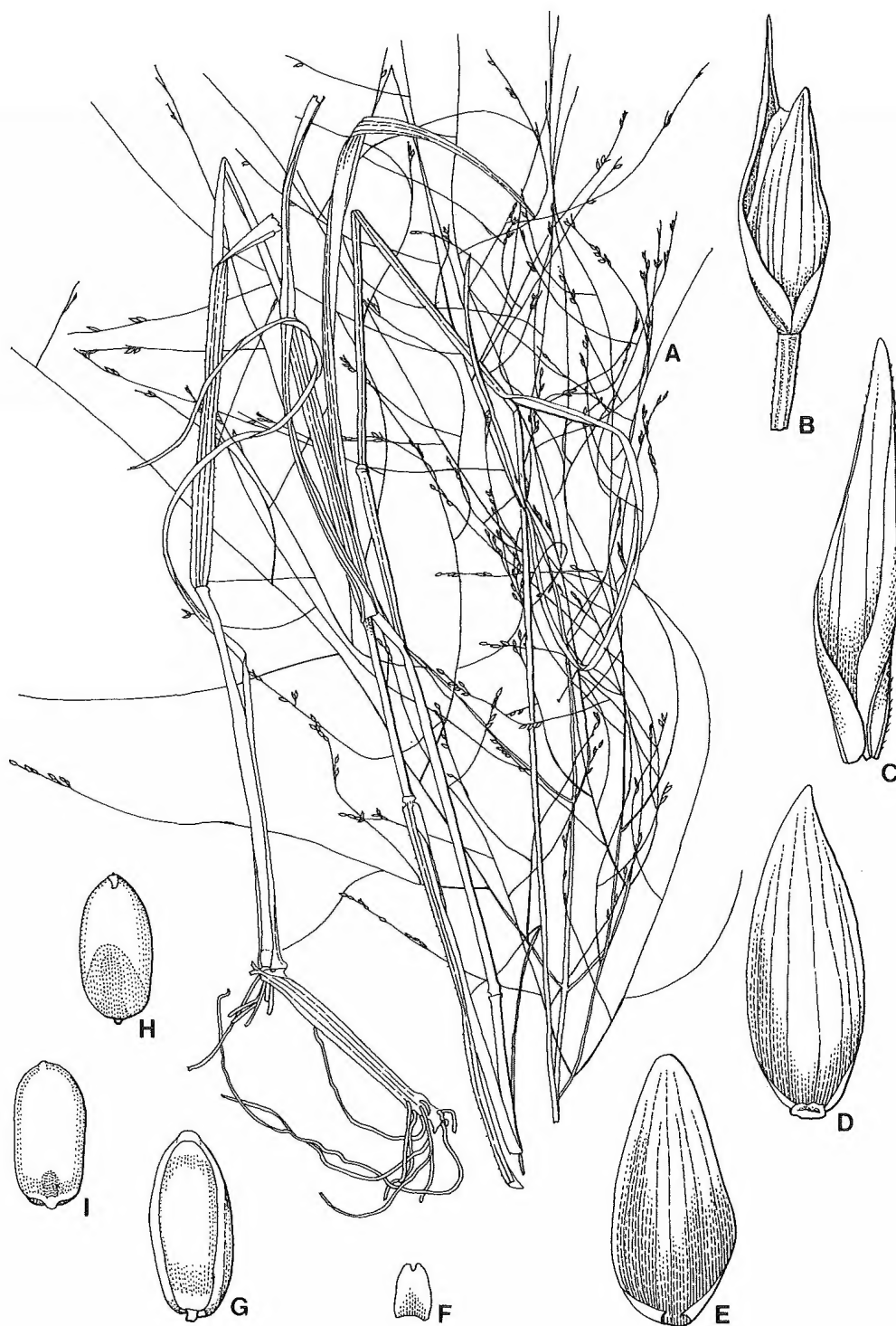


Fig. 6. *Panicum robustum*: A. plant $\times 0.4$. B. spikelet $\times 8$. C. lower glume, front view. D. upper glume, front view. E. lower lemma, front view. F. lower palea $\times 12$. G. upper floret, front view. H. caryopsis, view of side with embryo. I. caryopsis, view of side with hilum. (C-I, $\times 12$). From type specimen.

mark, 8 September 1977, *G.N. Batianoff* 651 & *T.J. McDonald* (holo: BRI(AQ 294456; 3 sheets BRI 294250, BRI 245882 and BRI 245883)). **Fig. 7.**

Plants perennial. Culms stoloniferous, basally decumbent, to 40 cm tall, 2–3-noded, sparingly branched, terminated by a solitary inflorescence. Internodes shorter than the associated leaf sheaths. Sheaths rounded on the back. Ligule a membrane c. 1 mm long, entire. Leaf blades linear, flat or convolute, 8–16 cm × 2–4 mm, glabrous, with smooth margins, with marginal tubercle-based hairs at blade-sheath junction. Inflorescence of 2 or 3 spicate branches, with the main axis 1.5–2.5 cm long and smooth. Primary branches spreading, 6–9 cm long, smooth on the margins, rachis flattened, ± 2 mm broad. Pedicels extremely short, c. 0.5 mm long, distinctly angled, smooth. Disarticulation at the base of the spikelet. Spikelets dorsiventral compressed, elliptic in outline, c. 4.5×1.5 mm. Lower glume absent. Upper glume elliptic, c. 4.5 mm long, 2-nerved, rounded on the back, coriaceous, glabrous. Lower lemma elliptic, coriaceous, the surface glabrous, acute, c. 4.2 mm long. Palea of lower floret absent. Upper floret perfect, slightly shorter than the lower floret. Upper lemma c. 3.5 mm long, yellow, coriaceous, smooth, elliptic, rounded on the back, glabrous, acute. Palea of upper floret coriaceous, smooth. Anthers c. 2 mm long. Caryopsis not observed.

Conservation status: This species is known only from the type and has been known about for a number of years by its inclusion in Thomas and McDonald (1987) as *Paspalum* sp. 'Statue Bay' (*G.N. Batianoff* 651) and in Briggs and Leigh (1988) as *Paspalum* sp. 1 (Statue Bay). In both these publications the designation 1K was assigned to it. Two further attempts to locate and collect the species at the type locality have not been successful so there is a possibility it should be designated 1X.

Etymology: The species is named for George Batianoff, a member of the staff of the Queensland Herbarium, who has shown great enthusiasm in collecting plants from coastal Queensland and associated islands.

Notes: *Paspalum batianoffii* differs from *P. notatum* Fluegge by its stoloniferous culms, longer and narrower spikelets (c. 4.5×1.5 mm compared to $2.8\text{--}3.7 \times 2.0\text{--}2.8$ mm in *P. notatum*). It differs from *P. multinodum* B. Simon by its stoloniferous culms, fewer nodes (2–3 nodes compared to 10–13 nodes in *P. multinodum*) and longer spikelets (c. 4.5 mm long compared to c. 3.5 mm long in *P. multinodum*). It differs from *P. vaginatum* Sw. by its longer inflorescence branches (6–9 cm long compared to 2–5 cm long in *P. vaginatum*) and its longer spikelets (c. 4.5 mm long compared to $2.5\text{--}3.7$ mm long in *P. vaginatum*) and by its broader rachis (c. 2 mm broad compared to c. 1 mm broad in *P. vaginatum*).

***Paspalum multinodum* B. Simon, sp. nov.** *P. notatum* Fluegge affinis, sed habitu caespitosis et spiculis angustioribus, *P. batianoffii* B. Simon affinis, sed habitu caespitosis, spiculis brevioribus, *P. vaginatum* Sw. affinis, sed habitu caespitosis, rachidibus latoribus, *P. scrobiculato* L. affinis, sed culmis elatioribus, rachidibus latoribus differt. **Typus:** Queensland. COOK DISTRICT: Aurukun, collector unknown s.n., (holo: BRI(AQ 540191); iso: CANB,K,L). **Fig. 8.**

Plants perennial. Culms erect, tufted, 1.5–2.0 m tall, 10–13-noded, unbranched, terminated by a solitary inflorescence. Internodes longer or shorter (distally) than the associated leaf sheaths. Sheaths keeled and compressed. Ligule a membrane 1.0–1.5 mm long. Leaf blades flat, linear, to 38 cm × 5 mm, glabrous, with smooth margins. Inflorescence spiciform with 2–6 racemes on main axis 0.5–1.0 cm long and smooth. Primary branches spreading, 3–8 cm long, smooth on the margins, rachis flattened, ± 2 mm broad. Pedicels extremely short, c. 0.5 mm long, smooth, straight. Disarticulation at the base of the spikelet. Spikelets dorsiventral compressed, elliptic in outline, c. 3.5×1.5 mm. Lower glume absent. Upper glume elliptic, c. 3.5 mm long, 3-nerved, rounded on the back, membranous, glabrous. Lower lemma elliptic, membranous, glabrous, subacute. Palea of lower floret absent. Upper floret perfect, shorter than the lower floret. Upper lemma elliptic, c. 3 mm long, white or yellow, coriaceous, smooth, rounded on the back, glabrous, apically rounded. Palea of upper floret coriaceous, smooth. Anthers and caryopsis not observed.

Additional specimen examined: Queensland. COOK DISTRICT: Mapoon Plain S of Cullen Point, N of Weipa, 11°5'S, 141°5'E, seasonally cracking clay plain, Sep 1980, *Godwin* A52 (BRI).

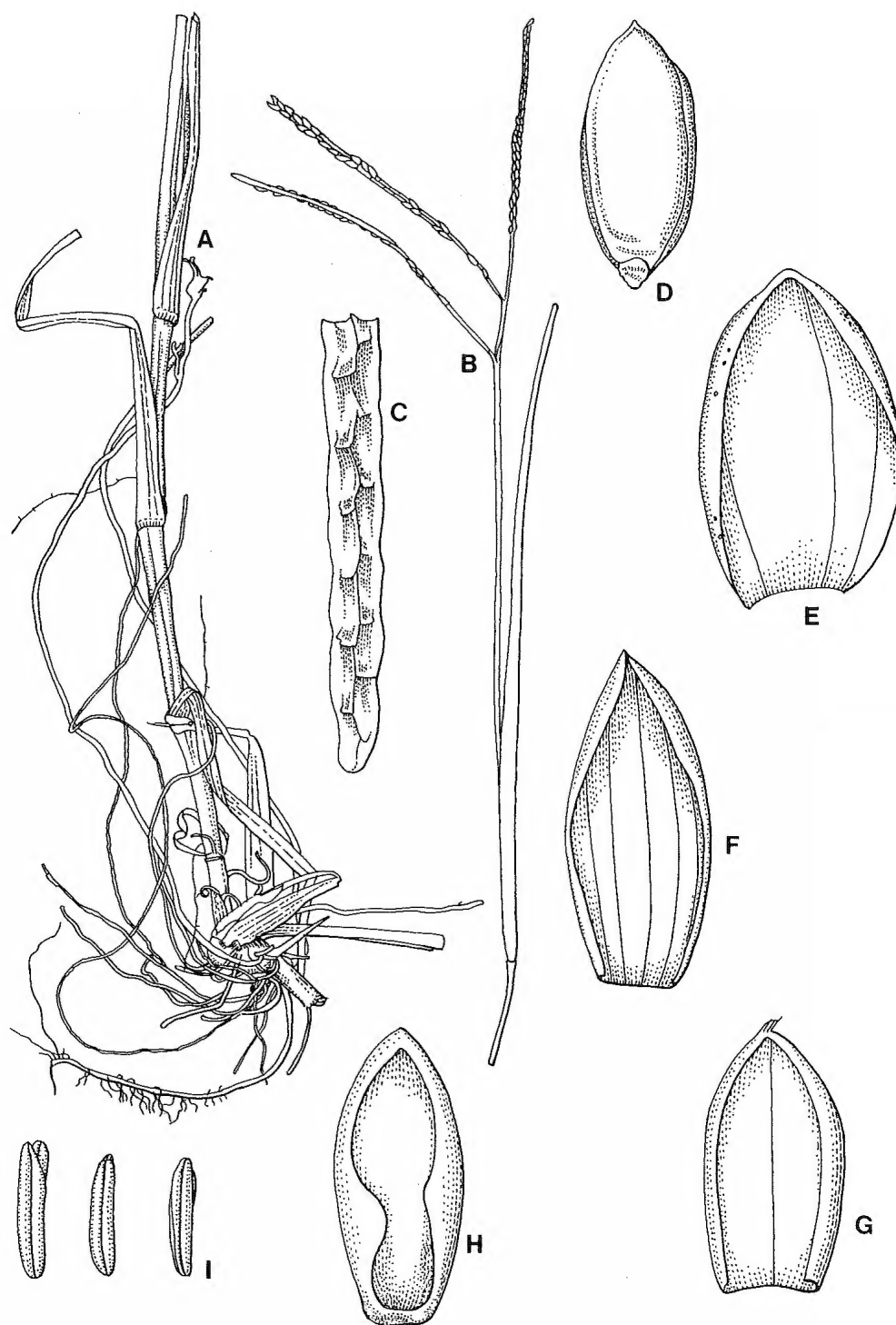


Fig. 7. *Paspalum batianoffii*: A. base of culm $\times 0.7$. B. apex of culm with inflorescence $\times 0.5$. C. portion of rachis of a spike $\times 4$. D. spikelet $\times 8$. E. upper glume, front view. F. lower lemma, front view. G. upper lemma, front view. H. upper palea, front view. I. anthers. (E-I, $\times 12$). From type specimen.

Conservation status: 2K (Briggs & Leigh 1988).

Etymology: The name is derived from the many-noded culms.

Notes: *P. multinodum* is similar to *P. batianoffii* B. Simon in having a broad rachis, but differs from that species by its smaller spikelets (c. 3.5 mm long compared to c. 4.5 mm long in *P. batianoffii*) and its tufted habit. It differs from *P. notatum* Fluegge by its narrower spikelets (c. 1.5 mm wide compared to 2.0–2.8 mm wide in *P. notatum*) and its tufted habit. It differs from *P. vaginatum* Sw. by its broader rachis (c. 2 mm broad compared to c. 1 mm broad in *P. vaginatum*) and tufted habit. It differs from *P. scrobiculatum* L. by its taller culms (1.5 to 2 m tall compared to less than 1.5 m in *P. scrobiculatum*) and its broader rachis (c. 2 mm broad compared to c. 1 mm broad in *P. scrobiculatum*). Only two collections of this species are known. One is from a plant grown from seed collected at Aurukun by a collector not designated and with the name of "Moonpoon Grass", according to a note attached to the specimen by S.T. Blake. This has been selected as the type, despite the scanty field information associated with it, as it has a number of duplicates that will be distributed to other herbaria. The other is a unicate specimen from the Mapoon Plain south of Cullen, and presumably the source of the name "Moonpoon" in "Moonpoon Grass".

It was originally thought that *P. batianoffii* and *P. multinodum* may be naturalised New World species but material of them could not be matched from the American collections of *Paspalum* in the Kew herbarium (S.A. Renvoize pers. comm.), nor were fragments and photographs of them recognised by Dr Fernando Zuloaga, a recognised authority of the genera *Paspalum* from the herbarium of the Instituto de Botanica Darwinion, Buenos Aires (SI). It is on the basis of these communications that I decided to name them as new species.

Yakirra Lazarides & R. Webster

Diagnostic features of *Yakirra* include a straight, swollen rachilla between the florets, a conspicuous rachilla between the glumes and a smooth surface on the upper floret. All species except *Y. nulla* Lazarides & R. Webster also have two appendages from the apex of the stipe of the fertile, upper floret. There are two specimens of a new species of *Yakirra* from western Queensland which have these stipe appendages but they are short and hard compared to the appendages in all other species of this genus which have them. Superficially this entity resembles *Panicum effusum* var. *effusum*.

Yakirra websteri B. Simon, **sp. nov.** *Y. muelleri* (Hughes) Lazarides et R. Webster, *Y. majusculae* (F. Muell. ex Benth.) Lazarides et R. Webster, *Y. australiensis* (Domin) Lazarides et R. Webster et *Y. pauciflorae* (R. Br.) Lazarides et R. Webster affinis, sed stipitis flosculi fertili appendicibus brevibus et duris, flosculo superno brunneo vel luteo et habitu perenni differt. **Typus:** Queensland, MITCHELL DISTRICT: 93 km N of Langlo Crossing, 20 May 1975, G.R. Beeston 1361C, (holo: BRI(AQ 268164); iso: BRI,CANB,K,NSW) **Fig. 9.**

Plants perennial. Culms erect, tufted, 25–80 cm tall, 2–3-noded, unbranched, terminated by a solitary inflorescence. Internodes shorter than the associated leaf sheaths. Sheaths rounded on the back. Ligule a fringe of hairs c. 0.5 mm long. Leaf blades linear, flat, 7–12 cm × 2–5 mm, pubescent with tubercle-based hairs; margins scaberulous. Inflorescence a panicle with main axis 12–20 cm long, hairy with tubercle-based hairs. Primary branches spreading, to 10 cm long (longest at base of rachis), scabrous on the margins. Pedicels 2–8 mm long, distinctly angled, scabrous, straight. Disarticulation at the base of the spikelet. Spikelets abaxial, dorsiventral compressed, ovate in outline, 2.5 × 1.5 mm. Lower glume triangular, c. 1.5 mm long, 3- sub 5-nerved, membranous, scabrous on nerves, glabrous, acute. Upper glume ovate, c. 2.5 mm long, 9-nerved, rounded on the back, membranous, glabrous. Rachilla conspicuous between the glumes. Lower lemma ovate, membranous, glabrous, acuminate. Palea of lower floret ovate, acute. Upper floret perfect, shorter than the lower floret. Basal stipe producing two small hard appendages. Upper lemma elliptic, c. 1.8 mm long, brown with white nerves or yellow, chartaceous, rounded on the back, glabrous, apically rounded. Palea of upper floret chartaceous,

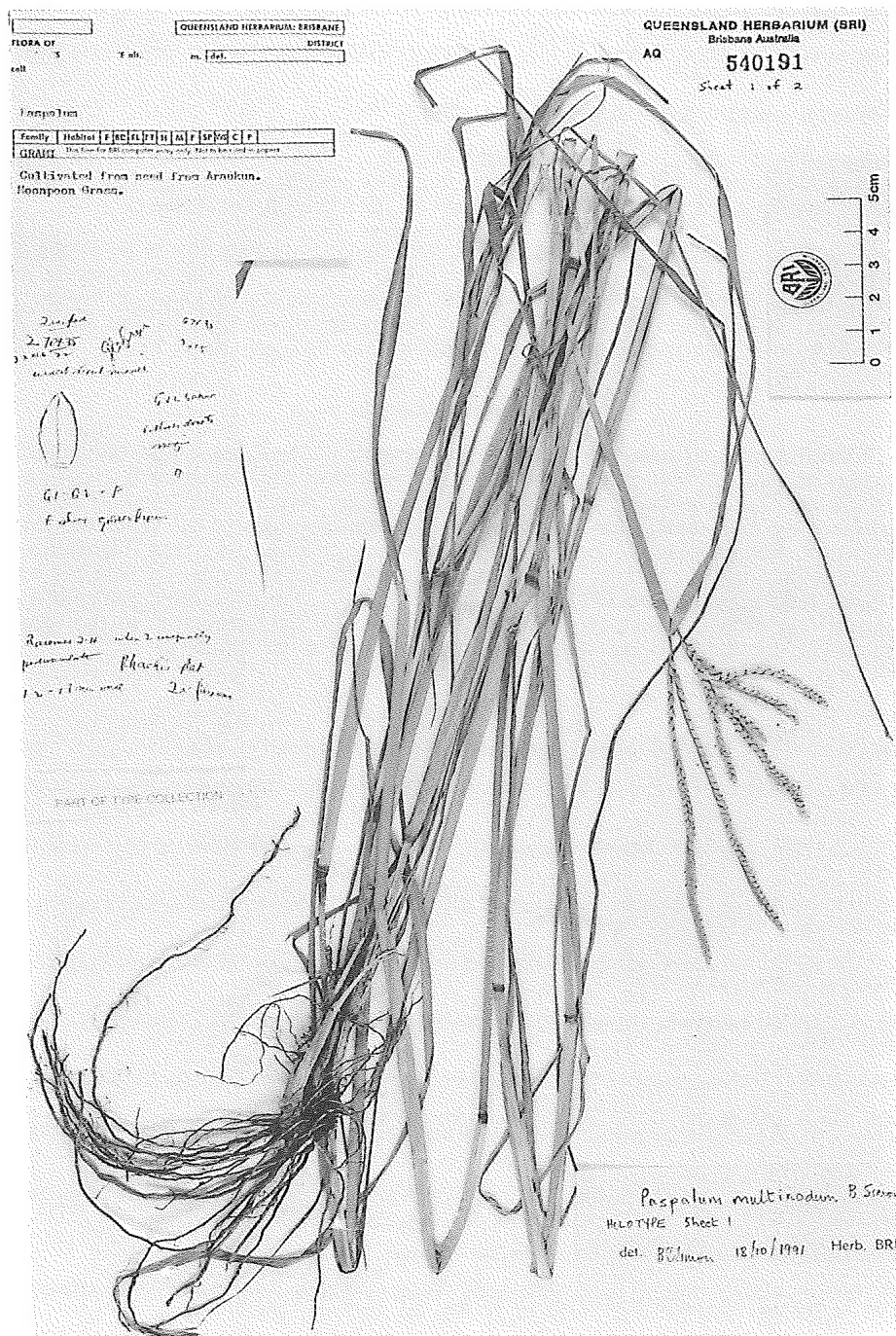


Fig. 8. Holotype of *Paspalum multinodum*, Sheet 1.

uniformly striate. Anthers not observed. Caryopsis c. 1.5 mm long with hilum less than half as long as caryopsis.

Additional specimen examined. Queensland. MARANO DISTRICT: 39 km from Roma on Injune road, May 1975, Simon 2859 & Clarkson (BRI).

Conservation status: 3K (Briggs & Leigh 1988).

Etymology: The species is named for Robert Webster, U.S.D.A. at Beltsville, who studied the Australian taxa of the tribe Paniceae at the Research School of Biological Sciences, A.N.U., using DELTA and is currently editor of the DELTA Newsletter.

Notes: *Yakirra websteri* differs from *Y. muelleri* (Hughes) Lazarides et R. Webster, *Y. majuscula* (F. Muell. ex Benth.) Lazarides et R. Webster, *Y. australiensis* (Domin) Lazarides et R. Webster and *Y. pauciflora* (R. Br.) Lazarides et R. Webster by the stipe of the upper, fertile floret having shorter and hardened appendages by the fertile floret being brown to yellow in colour and by the plant having a perennial habit.

Acknowledgements

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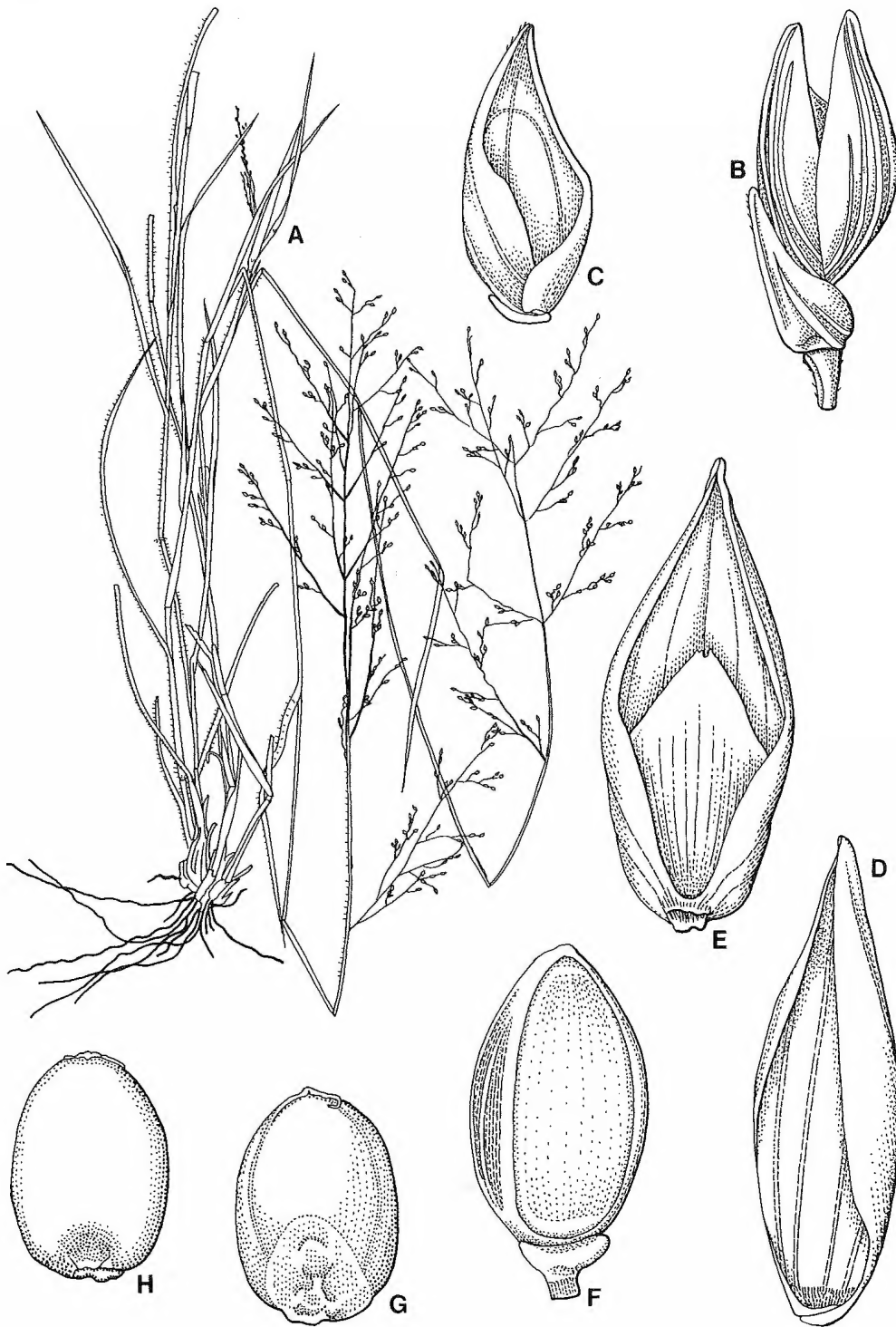


Fig. 9. *Yakirra websteri*: A. plant $\times 0.33$. B. spikelet, lateral view $\times 16$. C. lower glume, front view. D. upper glume, front view. E. lower floret, front view, showing lemma enclosing palea. F. upper floret, front view, showing the two basal appendages. G. caryopsis, view of side with embryo. H. caryopsis, view of side with hilum. (C-H, $\times 25$). From type specimen.

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